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TITLE

SURVEY OF THE MOUNTAIN PINE
BEETLE INFESTATION ON THE KOOTENAI
NATIONAL FOREST IN 1946 AND 1947

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Due to more urgent demands upon the writer's time the complete report of surveys made in the Kootenai National Forest in 1946 was not submitted during the winter of 1946-1947. For that reason this report contains data for both the 1946 and 1947 survey projects.

The survey as planned for in 1946, was divided into two periods. A preliminary extensive reconnaissance was made in August, and a more intensive examination of areas known to be infested was to have been made in September and October. However, shortage of survey personnel prevented following this plan as designed.

Four general areas were examined in the preliminary survey. The data for them is given in the succeeding paragraphs.

North Fork of Keeler Creek Unit

Acreage 1800

<u>Green Trees</u>		<u>Mountain-pine-beetle-</u>							
<u>Per Acre</u>		<u>killed western white pine per acre</u>							
White : Pine :	: Infested : Mixed : in 1946	% of green	:	Red tops	:	% of green	:	Past loss	(1) % of green
:	:	:	:	:	:	:	:	:	:
20.1 : :	56.7 : :	.23 : :	1.1 : :	.43 : :	2.1 : :	2.2 : :	10.9 : :		

Survey Sample in Acres - 34.8
" " " % of total area - 1.9

Average D.B.H. of W.W.P. - 14"
Estimated age of stand - 140 Yrs.
Infested trees on unit - 419

It must be pointed out that this examination was made between the 8th and 12th of August and that only part of the current season's quota of new attacks would have occurred at that time.

(1) Refers in this and subsequent tables to standing western white pine killed by the mountain pine beetle in the past ten years.

Infested trees were noted only on the North Fork of Keeler Creek and occurred generally in groups of four and five with, however, a few containing seven or more trees.

It is understood the Neil's Lumber Company resumed logging in this drainage in the fall of 1946 and cut or planned to cut the infested trees.

South Fork of Keeler Creek Unit Acreage 4800

This unit consists of the South Fork of Keeler Creek, Halvorsen Creek and Spruce Creek. The timber in Keeler and Halvorsen Creeks lies in wide, level, creek bottoms. That in Spruce Creek is on steeper slopes and in a narrower creek bottom. The timber is mainly large, overmature hemlock and white pine with a small amount of white fir and larch intermixed.

Infestation in this unit was light in 1946, but recent heavy losses have occurred in Keeler and Halvorsen Creeks.

The data for this unit is shown in the following tabulation.

<u>Green trees per acre</u>		<u>Mountain-pine-beetle- killed western white pine per acre</u>	
White : : Infested : % of : Red : % of : Past : % of			
Pine : Mixed : in 1946 : green : tons : green : loss : green			
:	:	:	:
17.9 : 77.5 : .018 : .10 : .09 : .50 : 1.0 : 5.6			
Survey sample in acres - 54.2		Average D.B.H. of W.W.P. - 18"	
" " " % of total area - 1.1		" age of stand - 160+ yrs.	
		Infested trees on unit - 86	

The preceding data indicates the small amount of mountain pine beetle activity which was present on the unit in 1946.

Madge Creek Unit Acreage 1400

This unit contains about 1,000 acres of cut-over land and 400 acres of virgin timber. The short strip run in that drainage was confined to the cut-over area. The data from the sample shows the following condition:

Green trees
per acre

Mountain-pine-beetle-killed western white pine per acre

White : : Infested : % of : Red : % of : Past : % of
 Pine : Mixed : in 1946 : green : tops : green : loss : green
 : : : : : : : :
 11.9 : 52.0 : None : None : .12 : 1.05 : 1.88 : 15.8

Survey sample in acres - 8.0
" " " $\frac{1}{8}$ of total area - .57

Average D.B.H. - 12"
Infested trees on unit - none

No active infestation was noted on the area, and but few red-tops were observed. Past losses, however, have been quite heavy.

Spar Lake Unit

Acreage 4960

This unit has been logged in recent years leaving a residual stand of western white pine averaging about 12 inches in D.B.H. and comprising slightly less than 20 percent of the number of trees in the stand.

No attacks of the mountain pine beetle which had occurred in 1946 were noted in the 11.6 acres of strip and only one red top. Past losses have also been quite light. The data for the area is as follows:

Green trees
per acre

Mountain-pine-beetle-
killed western white pine par acre

White		Infested	% of	Red	% of	Past	% of
Fine	Mixed	in 1946	green	tons	green	loss	green
12.9	54.7	--	--	.09	.71	.60	4.7

Survey sample in acres - 11.6
" " " % of total area - 2.3

Average D.B.H. of W.W.P. - 12"
Infested trees on unit - none

Data for the survey made late in the summer of 1946 is given for the following units.

Pete Creek Unit

Acreage 2580

The data from the two strips run on this unit have been applied to the two areas on which they were run. These areas are separated by Beetle Creek and Pete Creek, the larger area being 2,180 acres to the south and east respectively of these two drainages and the smaller of 700 acres to the north and west. This smaller area comprises that on which control work has been conducted for the last two years. Data obtained was as follows:

Area I

Acreage 2,180

<u>Green trees per acre</u>	<u>Mountain-pine-beetle- killed western white pine per acre</u>					
White : : Infested : % of : Red : % of : Past : % of						
Pine : Mixed : in 1946 : green : tons : green : loss : green						
: : : : : : : :						
16.6 : 58.5 : None : None : .07 : .40 : .73 : 4.46						
Survey sample in acres - 15	Average D.B.H. - 15"					
" " " % of total area - .7	Average age 160 yrs.					
	Infested trees on unit - none					

The survey sample taken from this area was quite small. Although no new attacks were recorded, it is believed that this would be a bit conservative, judging from conditions noted in the area during previous years.

Area II

Acreage 700

The second and smaller area still supports a potentially serious infestation. The data from the 1.6 percent coverage of the area is as follows:

<u>Green trees per acre</u>	<u>Mountain-pine-beetle- killed western white pine per acre</u>					
White : : Infested : % of : Red : % of : Past : % of						
Pine : Mixed : in 1946 : green : tons : green : loss : green						
: : : : : : : :						
21.3 : 64.0 : .273 : 1.3 : .18 : .85 : 1.8 : 8.55						
Survey sample in acres - 11	Average D.B.H. - 16"					
" " " % of total area - 1.6	Average age - 160 yrs.					
	Infested trees on area - 191					

The sample of survey was too small to guarantee an accurate estimate of conditions but does indicate a potentially serious infestation.

Leigh Creek Unit

Acreage 480

This unit consists of approximately 480 acres of white pine timber type lying in the creek bottom of Leigh Creek. The lower end has been logged and cedar poles are being taken from the area above the road.

The stand consists of white pine, cedar, white fir, larch and lodgepole pine.

The stand is in a healthy uncrowded state of growth and no red tops or infested trees were noted either on or off of eleven acres of sample plots. Data for the unit is as follows.

<u>Green trees per acre</u>	<u>Mountain-pine-beetle- killed western white pine per acre</u>					
White : Pine :	Infested : Mixed : :	% of : in 1946 : :	Red : green : :	% of : tons : :	Past : green : :	% of : green : :
35.8 : 55.2 : :	none : none : :	.09 : .03 : :	2.9 : 3.1 : :			
Survey sample in acres - 11		Average D.B.H. of W.W.P. - 17"				
" " " % of total area - 2.3		Average age of stand - 160				
Infested trees on unit - none						

Spread Creek Unit

Acreage 1280

The treatment of 30 trees in this area in the spring of 1946 has probably reduced this infestation to an even smaller number of trees. The 1.5 percent coverage of the area in survey failed to encounter any attacked trees. However, it is probable that a few trees are present on the area but the number would be too few to warrant concern. Data from the strip run on the area in 1946 indicates the following condition.

<u>Green trees per acre</u>	<u>Mountain-pine-beetle- killed western white pine per acre</u>					
White : Pine :	Infested : Mixed : :	% of : in 1946 : :	Red : green : :	% of : tons : :	Past : green : :	% of : green : :
27.1 : 44.8 : :	none : none : :	.10 : .41 : :	.26 : 1.03 : :			
Survey sample in acres - 19		Average D.B.H. - 12.6				
" " " % of total area - 1.5		Infested trees on unit - none				

Ramsey Creek Unit

Acreage 2560

This unit includes Libby, Poorman, and Ramsey Creek drainages. The indicated infestation of .15 trees is believed to be somewhat high due to too small a sample of the area and to the strip having included a group of five attacked trees. Only three other attacked trees were noted on the area and six red tops. The data for the unit is as follows:

<u>Green trees per acre</u>	<u>Mountain-pine-beetle killed western white pine per acre</u>					
White : Pine : :	Infested : Mixed : in 1946 :	% of : green : :	Red : tons : .64 :	% of : green : .174 :	Past : loss : .74 :	% of : green : 2.91 :
23.6 : 56.2 : 23.6	: .152 : " "	: .152 : % of total area - 1.8	: .64 : " "	: .174 : " "	: .74 : " "	: 12.3 : Infested trees on unit - 389

Although existing infestation is light, it should be examined in the near future for any serious increase.

Meadow Creek Unit

Acreage 1400

The infestation in this unit is light, with only .06 of an infested tree per acre as derived from 12 acres of sample plots. Red-tops noted along the road end in the logged-off area are chiefly the result of logging operation and show no mountain pine beetle work. The data for the unit is as follows.

<u>Green trees per acre</u>	<u>Mountain-pine-beetle killed western white pine per acre</u>					
White : Pine : :	Infested : Mixed : in 1946 :	% of : green : :	Red : tons : .53 :	% of : green : .083 :	Past : loss : .53 :	% of : green : 3.5 :
15.7 : 52.0 : 15.7	: .083 : " "	: .083 : % of total area - .86	: .53 : " "	: .083 : " "	: .53 : " "	: 2.2 : Infested trees on unit - 116

Survey sample in acres - 12 Average D.E.H. of W.W.P. - 12"
 " " " " age of stand - 120 yrs.
 infested trees on unit - 116

The main white pine stand on this unit lies in the area between the North Fork and Meadow Creek, with a small portion lying on the east side of the South Fork of Meadow Creek. The upper area of Meadow Creek has been cut over in recent years leaving approximately 15 western white pine per acre.

The stand on this unit consists of white fir, white pine, larch, cedar, and lodgepole pine.

Bear Creek Unit

Acreage 2200

The Bear Creek Unit lies in the creek bottoms of Bear and Cable creeks and on the flat of Cherry Creek near the mouth of Bear and Cable Creeks.

The timber stand consists of white pine, cedar, white fir, larch and a small amount of lodgepole pine.

No new mountain pine beetle attacks and only one red top was found on 26 acres of sample plots. This unit seems to be almost free of mountain pine beetle infestation. The data for this unit follows:

<u>Green trees per acre</u>	<u>Mountain-pine-beetle killed western white pine per acre</u>
White : : Infested : % of : Red : % of : Past : % of	
Pine : Mixed : in 1946 : green : tops : green : loss : green	
:	:
30.5 : 69.4 : none : none : .038 : .13 : 1.77 : .058	
Survey sample in acres - 26	Average D.B.H. - 16"
" " " % of total area - 1.18	Average age of stand - 160 yrs.
	Infested trees on unit - none

MOUNTAIN PINE BEETLE INFESTATION
IN LODGEPOLE PINE ON THE
KOOTENAI NATIONAL FOREST
1947

This report concerns the survey made of that portion of the Warland Ranger District in the vicinity of Warland, Montana, and on the west side of the Kootenai River, the Horse Lakes Area of Big Creek and the Fleetwood and Rainy Creek Drainages in the vicinity of Zonolite Mountain. Only on the Horse Lakes and Zonolite Mountain areas were epidemic conditions of the mountain pine beetle observed. Surveys of these two areas were made but increasingly adverse working conditions forced a termination of survey on the Horse Lakes area before a full knowledge of amount and boundary of infestation had been obtained. In the following pages the data and conclusions drawn from the survey are presented.

Horse Lakes Unit

1100 Acres

During the summer of 1947, a timber survey crew of the Kootenai National Forest reported the presence of a severe mountain pine beetle infestation in lodgepole pine in the Horse Lakes area. Survey of this infestation was made in early November of 1947. The infested area lies on the South Fork of Big Creek and the East Fork of Pipe Creek in parts of sections 19, 20, 29, 30, 31 and 32 in T. 34N., R. 30W. There are about 1100 acres involved which in general has the same boundary as the

accessible, mature lodgepole pine in this area recently set up as a potential lodgepole pine pole sale. In the portion of this area east of Big Creek as much as 75 percent of the mature lodgepole pine has been killed in the last 15 years with an average loss of about 40 percent. West of Big Creek the beetles have taken an average of about 25 percent of the stand.

This survey revealed the heaviest concentration of infested trees in the east quarter of section 30 and the west quarter of section 29. Elsewhere the infestation is lighter.

Windfall, both in 1947 and prior to that time, has been more or less heavy over the entire area. In spite of these heavy losses, there is still an excellent stand of tall, slim lodgepole pine approximately twelve inches in diameter. Pure lodgepole pine is present over part of the area. Elsewhere the associated species noted are larch, Engelmann spruce, white fir, and small amounts of cedar and western white pine. The trees attacked in 1947 have a long infested length and the numerous brood present indicates a decided increase in attacked trees in 1948.

The comparatively light infestation per acre, numerous windfalls, rough terrain over part of the area, and comparative inaccessibility, would make control expensive on this unit.

The following data were obtained from the survey:

<u>Horse Lakes Unit</u>	<u>1100 Acres</u>
Infested lodgepole pine per acre	1.87
Percent of stand infested	3.1
" " area sampled	7.0
Total infested trees in area	2,057
Green lodgepole pine per acre	69.0

<u>Zonolite Unit</u>	<u>160 Acres</u>
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The outbreak on this unit is heavily concentrated on about 160 acres, chiefly in the S.W. $\frac{1}{4}$ of Sec. 14, T. 31N., R. 30W., with small acreages in the adjoining sections.

Much of the infested area supports a pure lodgepole stand but larch comprises part of the south edge. Douglas fir and ponderosa pine are to the north, and a continuation of lodgepole pine extends westward. Within the infested area there are numerous places where aspen occurs in mixture with lodgepole pine with a few patches of pure aspen 3 to 4 acres in extent along the stream bottom. In the southeastern part of the infested area the timber is fairly tall but elsewhere the trees are short with relatively long crowns.

Outstanding features of this outbreak are its concentration and definite boundaries. In the southeast portion of the area there are a number of acres on which an almost 100 percent kill has occurred in the past year or two. A similar high percent of kill in 1947 occurred to the northwest of and adjoining this killed area. Around these areas the infestation continues fairly heavy to its abrupt boundary within the stand. Usually there is a gradual decrease in number of attacked trees with increase in distance from a heavy infestation, but this outbreak is unusual in the abrupt change from numerous to no infested trees. Examination of nearby stands of lodgepole pine to the west, northwest, and north revealed no infestation.

The high concentration of infestation, generally small size of infested trees (about 10-11 inches diameter), terrain that offers comparatively easy working conditions, and accessibility of the area, all combine to make an easy control problem of this outbreak.

Breed in the infested trees was quite heavy, giving every prospect of a large increase in number of attacked trees in 1948. Should no control be instituted, the adjoining and nearby stands of lodgepole pine will probably be invaded when host material in the present area is exhausted by the bark beetle population. There is also the possibility that decreasing lodgepole pine host material may force the bark beetles into the ponderosa pine. Only two infested ponderosa pine were noted on the area in spite of a mixture of this species with infested lodgepole pine.

An analysis of the data is summarized in the following tabulation.

<u>Zonolite Unit</u>	<u>160 Acres</u>
Infested lodgepole pine per acre	15.9
Percent of stand infested	18.3
" " area sampled	14.4
Total infested trees on area	2549
Green lodgepole pine per acre	71.0

The survey in 1947 was limited to the preceding areas. Other areas would have been examined had time and weather conditions permitted. However, a very reassuring report of conditions on the Pete Creek Unit was made by Forest Service personnel who visited the area during the 1947 field season.